

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2160 -1 REV:06/13/88
 ASSEMBLY : D & C PANEL R2 CRIT. FUNC: 1R
 P/N RI : ME451-0018-0100 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 2 EFFECTIVITY: X X X
 : TWO PHASE(S): PL LO X OO DO LS
 :

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES JNB J BROWN DES [Signature] EPDC SSM [Signature]
 REL [Signature] DEFENSOR REL J. Kamura 6/29/88 MPS SSM [Signature]
 QE [Signature] D MASAI QE [Signature] EPDC REL [Signature]
 MPS REL [Signature]

ITEM:
 FUSE, (1 AMP), MPS PROPELLANT DUMP SEQUENCE CONTROL CIRCUIT.

FUNCTION:
 PROVIDES CONTROL BUS PROTECTION IN THE EVENT OF MPS PROPELLANT DUMP SEQUENCE CONTROL CIRCUIT FAULTS. 32V73A2F31, F32.

FAILURE MODE:
 FAILS OPEN, FAILS TO CONDUCT.

MODE(S):
 STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY
 (A) LOSS OF ONE OF TWO COMMANDS (A OR B) TO SWITCH REDUNDANCY MANAGEMENT (RM).
 (B) LOSS OF MANUAL MPS DUMP SEQUENCE START AND STOP COMMAND CAPABILITY.
 (C,D) NO EFFECT - FIRST FAILURE.

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(E) CASE I: LH2

1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.

TIME FRAME - DIRECT INSERTION MISSION, POST MECO, PRIOR TO DUMP.

- 1) FUSE FAILS OPEN, RESULTING IN LOSS OF MANUAL START COMMAND CAPABILITY.
- 2) LH2 MANIFOLD RELIEF SYSTEM FAILS TO RELIEVE.

FOR DIRECT INSERTION MISSIONS, CREW USES SWITCH TO MANUALLY INITIATE DUMP SEQUENCE (OMS-1 BURN AUTOMATICALLY STARTS DUMP FOR NOMINAL INSERTION MISSIONS). FIRST FAILURE RESULTS IN LOSS OF THIS CAPABILITY.

LH2 REMAINING IN MANIFOLD CANNOT BE RELIEVED. RESULTS IN OVERPRESSURIZATION AND RUPTURE OF THE FEEDLINE MANIFOLD. RTLS DUMP VALVES ARE OPENED FOLLOWING MECO, BUT NOT LONG ENOUGH TO DUMP THE MAJORITY OF REMAINING LH2. AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

CASE II: LO2

1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE.

TIME FRAME - DIRECT INSERTION MISSION, POST MECO, PRIOR TO DUMP.

- 1) FUSE FAILS OPEN, RESULTING IN LOSS OF MANUAL START COMMAND CAPABILITY.
- 2) LO2 MANIFOLD RELIEF SYSTEM FAILS TO RELIEVE.

FOR DIRECT INSERTION MISSIONS, CREW USES SWITCH TO MANUALLY INITIATE DUMP SEQUENCE (OMS-1 BURN AUTOMATICALLY STARTS DUMP FOR NOMINAL INSERTION MISSIONS). FIRST FAILURE RESULTS IN LOSS OF THIS CAPABILITY.

LO2 REMAINING IN MANIFOLD CANNOT BE RELIEVED. RESULTS IN OVERPRESSURIZATION AND RUPTURE OF THE FEEDLINE MANIFOLD. AFT COMPARTMENT OVERPRESSURIZATION AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYOGENIC EXPOSURE. POSSIBLE LOSS OF CREW/VEHICLE.

A VENT PATH EXISTS (APPROXIMATELY 4 SCFM PER BLEED CHECK VALVE) THROUGH THE POGO SYSTEM TO THE SSME HPOT SEAL AND RELEASED OVERBOARD. THIS VENT PATH IS NOT CONSIDERED SUFFICIENT TO RELIEVE THE LO2 MANIFOLD IF THE MANIFOLD RELIEF SYSTEM FAILS.

ABORT 1/1 FOR OI-9C CONTINGENCY RTLS MISSION. CREW USES SWITCH TO MANUALLY INITIATE CONTINGENCY RTLS DUMP. FAILURE TO DUMP CAUSES GH2 VENTING THROUGH FLAME ARRESTOR (FL1). INGESTION OF VENTED GH2 RESULTS IN HAZARDOUS CONCENTRATION IN AFT COMPARTMENT PRIOR TO BAILOUT OPPORTUNITY. POSSIBLE AFT COMPARTMENT FIRE/EXPLOSION. POSSIBLE LOSS OF CREW.

05-6J-263

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SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2160 -2 REV:06/13/88

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A-D) FOR DISPOSITION AND RATIONALE:

REFER TO APPENDIX D, ITEM NO. 4 - FUSE, PLUG-IN TYPE.

(B) GROUND TURNAROUND TEST

PROPELLANT DUMP SEQUENCE SW VERIF V41AFO.260B, D EVERY FLIGHT.

(E) OPERATIONAL USE

LH2/LO2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING. CREW WILL OPEN THE APPROPRIATE LH2/LO2 FILL AND DRAIN VALVES TO INERT THE SYSTEM.

05-6J-264